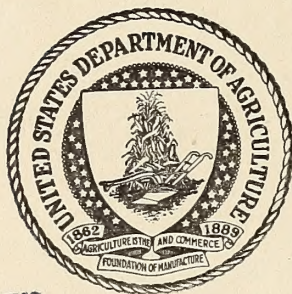


Historic, archived document

Do not assume content reflects current
scientific knowledge, policies, or practices.

UNITED STATES
DEPARTMENT OF AGRICULTURE
LIBRARY



Reserve

BOOK NUMBER	1.9
747242	F763C
	1930

7630
UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

BRANCH OF RESEARCH

MONTHLY REPORT

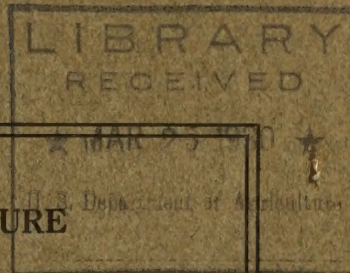
OF

FOREST EXPERIMENT STATIONS

FOREST PRODUCTS

FOREST ECONOMICS

RANGE RESEARCH



747242

BRANCH OF RESEARCH

January, 1930

CONTENTS

Page

Forest Experiment Stations

Washington Office	1
Allegheny	2
Appalachian	4
California	5
Central States	10
Lake States	12
Northeastern	14
Northern Rocky Mountain	15
Pacific Northwest	16
Southern	19
Southwestern	21
Branch of Research, D-2	22
Manuscripts	23

Forest Products

District 1	25
District 6	28

Forest Taxation Inquiry	30
-------------------------------	----

Range Research

Washington Office	32
Great Basin	35
Jornada	40
Santa Rita	41

FOREST EXPERIMENT STATIONS

WASHINGTON

Legislation

Of primary interest at this time is the status of the Agricultural Appropriation bill. The House reported the bill out carrying \$60,000 as an increase for silvicultural work including \$30,000, half for fire and half for redwood investigations in California; \$20,000 for the South, half for naval stores and half for management studies in second growth stands, and \$10,000 for management studies of western yellow pine in the Intermountain region. The Senate Agricultural Appropriation Committee has added to this \$25,000 for plains work in North and South Dakota, \$10,500 for southern hardwoods, and \$5,000 for studies of the Piedmont forest in the Appalachians. The increase of \$25,000 approved by the Budget for economic studies was not granted by the House but has been included in the Senate amendment to the bill.

Senate Committee Increases Under McSweeney-McNary Act Fiscal Year 1930-31

Sec. 2	<u>Forest Management</u>		
	House Bill.	\$60,000	
	Southern Forest Experiment Station-Southern hardwoods	10,500	
	Appalachian Forest Experiment Station - Piedmont hardwoods.	5,000	
	Lake States - Northern Great Plains forestation	25,000	
	Total		\$100,500
" 3	<u>Forest Pathology</u>		
	House Bill.	10,000	
	Total		10,000
" 4	<u>Forest Insects</u>		
	House Bill.	10,210	
	Total		10,210
" 5	<u>Biological Investigations</u>		
	House Bill.	10,000	
	Total		10,000
" 6	<u>Forest Fire Weather</u>		
	House Bill.	5,000	
	Total		5,000
" 7	<u>Range Research</u>		
	House Bill.	18,000	
	Total		18,000
" 8	<u>Forest Products</u>		
	House Bill.	35,000	
	Pulp possibilities of western softwoods . .	15,000	
	Total		50,000
" 9	<u>Forest Survey</u>		
	House Bill.	85,000	
	Total		85,000
" 10	<u>Forest Economics</u>		
	House Bill.	000	
	Possibilities of private forestry	25,000	
	Total		25,000
	<u>GRAND TOTALS</u>		
	House Bill.	233,210	
	Increase added by Senate Committee.	80,500	
	Total		\$313,710
	(Over)		

Details

Details arranged for the winter include Behre of the Northeast in January; Kotok, February and March; Sims in January; Gerorkiantz, February; Gisborne, February and March, and Watts, March.

-----#-----

ALLEGHENY FOREST EXPERIMENT STATION

General

The attention of the other eastern stations is called to the statement on page 28 of the annual report of the National Forest Reservation Commission dealing with Heart's Content, and to what appears to be the establishment of a new policy of the Commission, growing out of the Heart's Content purchase, and stated on page 22. We take it that this policy opens the way for the purchase, of course in small acreages, of virgin timber or very old growth as laboratories for scientific study.

Management

The completion of the Little Arnot Establishment Report has freed Hough for work on the extensive survey data. The permanent records of this plot, together with maps, height curves, and similar material, have been bound in Atlas form, and constitute a convenient exhibit to show visitors who are interested in some of the technical details of going projects. The work at Little Arnot has raised a number of questions on technique, none very important in itself, but in the aggregate well worth answering if we are to be consistent in our conduct of future investigations.

Hough and Wood, with some help from Forbes, have begun to assemble and digest the extensive survey data for 1928 and '29. Although by no means comprehensive, these data appear to warrant the preparation of a tentative report both on the future of white pine in northwestern Pennsylvania and the composition of the northern hardwoods type of northern Pennsylvania.

Mensuration

Schnur has completed all checks that we can think of here on the cordwood converting factor study, and the figures, accompanied by a brief explanation of the method used, have been submitted to Dr. Chambers of the University of Pennsylvania, Mathematics Department. If Dr. Chambers can find no errors in the mathematical technique, it seems

sketchy available data on the range of our common species. Considering the inadequacy of the range data, it hardly seems worth while to attempt to correlate distribution with weather conditions, at least for many species. A type map of the northern hardwoods (now maple-birch-hemlock, according to the Type Committee), which we believe we can obtain from the State of Pennsylvania, may reveal clearer relationships.

-----#-----

APPALACHIAN FOREST EXPERIMENT STATION

Selective Logging of Loblolly Pine

During the third week of the month Cuno, Pillow, Wollin, and Beglinger of the Forest Products Laboratory, and Nelson, Korstian, and MacKinney, of the Experiment Station met on the Foreman-Blades operation in Bertie County, N. C., to begin the logging and milling studies on the permanent sample plots which were laid out before the joint Laboratory and Station party disbanded in December. The plots are located in a typical old-field stand of loblolly pine 50 years of age. Four 2-acre sample plots were marked selectively as follows:

1. For a moderately heavy thinning in an overstocked portion of the stand in which the trees are smaller in size and many of them too small for profitable logging and milling.
2. A heavy cut estimated at 12 M bd.ft. per acre, with a residual stand of 2 M feet reserved as the nucleus for the next cut.
3. A light cut of about 7 M bd.ft. per acre, with a correspondingly large growing stock of 6 M feet reserved in the residual stand.
4. A moderately heavy cut of 10 M bd.ft. per acre and a residual stand of 4 M bd. ft. retained.

Recent reports from Windsor are to the effect that the logging and milling are being delayed materially by very bad weather, which is also complicating the transportation problem.

Study of Fire Damage to Forest Soils

Sims, under the direction of Hursh, is making determinations of physical structure and moisture relationships of soils from the Lanes, S. C., controlled burning areas. These studies are designed to furnish

that we have excellent proof that some early American theories concerning these converting factors are wrong. Before publishing revolutionary results, however, we intend to extend the field work to a study of oak cordwood, and will test some of the theories previously arrived at. Schnur spent two days with Mr. H. H. Tryon on the Stillman estate at Cornwall-on-the-Hudson, New York, where a large quantity of oak and other cordwood is being cut annually. This property of 4000 acres appears to be in a transition zone between the oak type and the northern hardwoods type, being composed chiefly of chestnut, red, and white oaks, with an admixture of yellow and black birches, yellow poplar, and basswood. It is to be used exclusively for research and demonstration purposes, being owned by one of the workers at the Boyce-Thompson Institute. Improvement cuttings are first on the program.

Types

Forbes' Type Committee for the Section met at the Station headquarters for a two-day session, and evolved the following list of seventeen types:

<u>Type</u>	<u>Mountains</u>	<u>Plateaus</u>	<u>Coastal Plain</u>
1. Spruce-hemlock	x		
2. Spruce-fir-larch	x	x	
3. Maple-birch-hemlock	x	x	
4. Aspen-fire cherry	x	x	
5. Yellow poplar-oak-maple	x	x	
6. Oak-hard pine	x	x	x
7. Oak	x	x	x
8. Scrub oak	x	x	x
9. Red cedar	x	x	x
10. Virginia pine	x	x	x
11. Grey birch	x	x	
12. Southern white cedar	x		x
13. River bottom and swamp hardwoods	x	x	x
14. White pine-hemlock	x	x	
15. Loblolly pine			x
16. Pitch pine			x
17. Cypress-gum-red gum			x

These types will be carefully defined, and recommended to the Section at its meeting on February 28.

Morey has now completed regional maps showing normal annual temperature and precipitation; average dates of first and last killing frosts; average length of growing season; normal summer precipitation and temperature; and mean minimum and mean maximum summer temperatures. He spent a few days in Washington copying from the files the somewhat

data for comparison of burned and unburned plots for both loblolly and longleaf pine types. The particular relationships that are being studied are (1) influence of burning on organic content of the soil; (2) relation of organic material in the soil to moisture content and water holding capacity; (3) influence of burning upon physical structure of the soil as determined by the size and nature of the soil particle aggregates.

These primary studies are designed to furnish the basic data for establishing the present soil structure conditions on the areas. They will be used for comparison with future soil structure conditions that may obtain through subsequent burning.

Wild Life Studies

Burleigh (Biological survey) spent much of the month collecting specimens of birds and mammals at Bent Creek. He is making a study of their food habits as shown by the stomach contents. He has made collecting trips to Mount Tisgah and Mount Mitchell.

-----#-----

CALIFORNIA FOREST EXPERIMENT STATION

Management

The original stand for the Stanislaus woods and mill study area averaged about 63,000 board feet per acre, of which 17 per cent was western yellow pine, 35 per cent sugar pine, 37 per cent white fir, and 11 per cent incense cedar. Under the heavy cutting system an average of 5,000 board feet per acre was left, as compared with 11,000 board feet by the Forest Service system and 34,000 board feet by the light economic selection system.

Preliminary damage figures indicate that 65 per cent of the reproduction was destroyed, principally by tractor yarding. Of the trees over 4 inches in diameter, 14 per cent were injured and 18 per cent killed. Felling caused 2-1/2 times as much damage as yarding to trees 4 inches in diameter and larger.

Forest Influences

The big snows of January 5 and 15 blanketed the mountains and brought cheer to those interested in and concerned with water supply in California. Both snow and rain approximated depths of 6 to 7 inches at the Devil Canyon installations and 7 inches at the North Fork installation for studying run-off, erosion, and water relationships of vegetation. The instrumentation was designed primarily for studying the effect of contrasted surface conditions under varying storm intensities

of rain. An unusual fall of snow, therefore, introduces an additional factor which requires consideration in installing such equipment at the higher elevations for studies in high forests.

Particular interest was centered in the North Fork installation which was put in in November of 1929. The big snow storm was the first real test of the installation. Excellent cooperation in these studies is being given by Forest Supervisor Benedict and his staff who are tending the instruments. Without this cooperation it would be impossible to maintain the installation. Sundling visited the installation after the storm and took soil samples for moisture determinations. The total depth of penetration of water was found to be in interesting correlation to surficial run-off, as shown in the following summary table.

Preliminary Results - North Fork Installation - Comparative
Run-off - Depth of Penetration

Storm of January 5 - 15. Snow and Rain. Melting Snow
to January 21.

	<u>Covered Plots</u>	<u>Burned Plots</u>
Surficial		
Run-off, cu. ft.	0.1 - 0.3	4.0
Penetration of		
Moisture, inches	36	16

These results are only preliminary and can not be accepted as the results of a season of rain. They do indicate, however, an interesting correlation with the effect of the forest cover on making the macro-structure of soil effective. Samples of soil to depths of 36 inches have indicated instructive examples of the work of soil fauna in favoring penetration. The condition at the soil surface determines the utility of the macro-structure of the soil profile.

Results from the Devil Canyon installations show that melting snow is more completely absorbed than rain, under the conditions of unfrozen soil, which is in line with expectations.

The water problem in California is one of perennial and persistent concern and activity. There are at present fourteen major agencies working definitely on water problems. This number includes the grouping of water associations and power companies together as one agency and all consulting hydraulic engineers as another single agency. Of particular interest to the work of the California Forest Experiment Station were two meetings which occurred during the month. The first was a meeting of the Conservation Association of Southern California at which

Governor Young made an address emphasizing the need of storing flood waters underground in the great valley fill basins. The studies of this association are comprehensive, including watershed problems as well as storage and recovery problems in the valleys. The work of the Station will correlate definitely in the consideration of water conservation in the mountain watersheds. The second meeting was that of the American Society of Civil Engineers through its subcommittee. At this meeting a program was drawn up to be followed at a meeting to be held in Los Angeles and San Bernardino on March 27, 28, and 29. It is the purpose of this meeting to present before engineers and water conservationists of the Pacific Slope the more technical phases of the consumptive use of water by vegetation. It is becoming increasingly more important to learn the role of vegetation in water economy in the regions of California where water is the principal raw product from the mountainous areas.

Southern California

All plantations at Devil Canyon suffered heavily from drought but interest lies in the fact that losses became fairly stabilized during midsummer. Examinations made in May, August, and December showed almost no loss after August. In a protection series of Coulter pine best results were obtained from two shingles set close to the plants on the south side; four shingles proved no better than two; paper mulch seemed ineffectual, even harmful. Seedpots were almost a complete failure - in 300 spots only 95 seedlings germinated, 2 lived until August, none survived the season. Of the 46 species and varieties of the genus *Pinus* sent us by the Eddy Tree Breeding Station, only *P. contorta* from Humboldt County, California showed 100 per cent survival in the December examination; eight other species showed over 60 per cent, seventeen species from 10 to 40 per cent, and fifteen species were complete failures.

It is proposed to repeat nearly all of the planting experiments at Devil Canyon this spring and to enlarge planting and sowing in newly burned areas.

Products

Woods and Mill Study:—The huge mass of data gathered on the Pickering Lumber Company project, is gradually assuming a stratified appearance. As each layer becomes more distinct, our vision of what lies ahead becomes less astigmatic.

Required for mill study	26,000	80-column tabulating cards
Required for depreciation	32,000	80-column tabulating cards

This is only part of the story, the woods data, the silvicultural records, the pathological and other studies not being included in the job slated for the Madison machine computation.

The depreciation study field forms, with data on about 650,000 feet B. M. of lumber, including all thicknesses, widths, and species cut during the mill study, will be in shape for card punching about the first of March. Code numbers are being entered in ink directly over the grade symbols and other hieroglyphics recorded in the field. This work can be done very rapidly by working on one item at a time, vertically from top to bottom of the forms (44 boards each sheet), whereas in card punching the operator must work horizontally across the page, one complete board at a time. With 95 coded variables, punching would be a laborious job - likewise checking - without the actual code numbers in view. A better field form can be worked up for future studies of this nature, now that the "workings" of the Hollerith equipment are better understood.

Lumber Stain Study:-A rough hand summary of certain items, worked up by the cooperating lumber company from our field forms, giving the results of the dipping experiments last year, shows some remarkable profits from the treatment of sugar pine selects dried under severe staining conditions. Around \$12 per M. feet was saved by dipping in three or four of the experimental piles. Straight mercuric chloride saved \$17.50 per M. feet in one test. Although the figures quoted are doubtless approximately correct, they are not for public distribution, for no check on the company computer's work was obtained and they entirely omitted many factors from the summaries. The data compare in complexity with those recorded for the depreciation study, and only the Hollerith can provide an adequate analysis in anything like a reasonable amount of time.

Heptane Study:-Some results of the 1928 experimental tapping work on the Lassen are of interest. The large control exercised upon oleoresin flow by climate, and specifically by temperature, are again strikingly emphasized. In 1928 a relatively high temperature was maintained throughout the season, after July 1, suffering no drop sufficient to produce night frosts from that date until the week of the close of operations in mid-September.

In 1927, on the other hand, there were marked local drops, with a general decline continuing from early August onward. The flow curves behaved in conformity with the temperature, showing in 1928 a yield sustained from early July to the end of operations at a level higher than that at which they began in June. What surprised us in this was that we had previously supposed a gradual drop in yield with the progress of the season to be normal and inevitable, being only varied in amount by the influence of climate. The 1928 results seem to show that such a drop is "normal" only because the average temperature usually decreases as the season advances beyond its usual peak.

Among the 1927 results, the superiority of narrow chipping is confirmed by 1928 results; but shallow chipping (1/4") failed in 1928 to produce as high a yield as 1/2" (which may be called moderately deep), both being on the same trees as in the preceding year. Perhaps the most surprising reversal is that in 1928 the double-chipping curve not only failed to show the severe decline of 1927 but in fact maintained its rate of flow without any decrease, just as the single-chipped trees did. All classes of chipping showed a 1928 average yield reduced below that of 1927; but this reduction in single-chipped trees was 13 per cent, while in double-chipped it was only 7 per cent, the average for all trees being 12 per cent. There is here no indication of excessive drain on tree vitality by double-chipping.

In 1928 78 new faces were chipped. The average yield of these per face per week was 3.33 ozs., as against an average yield of 2.78 ozs. from the 264 faces chipped for their second year. This corroborates the reduction in general average yield for 1928 as against the first year yield in 1927. A new departure in 1928 was the segregation of results by tree classes, in accordance with the Dunning tree-thrift classification. This showed the following results:

<u>Tree Classes</u>	<u>Yield, Ozs. per Cup per Week</u>
Class 1 (young dominants)	3.41
" 2 (" co-dominants)	2.76
" 3 (thrifty-mature, dom.)	2.98
" 4 (" " co.-dom.)	2.48
" 5 (over-mature)	2.83
" 6 (young, suppressed)	
" 7 (old, suppressed)	2.41

Entomology

Struble is now working on the nutrition of the western pine beetle. An attempt is being made to rear the larvae from egg to pupa on artificial media and then to determine the importance of different sugars associated in the development of this insect. The relation of an associated yeast to the nutrition of D. brevicornis will also be studied.

Jeffrey has just completed his report on the concentration of sugars in the bark of western yellow pine as related to western pine beetle attraction. He has found some interesting differences in the sugar concentrations that can be related to slow growth rate, and tree injury conditions, that have been found to affect the attractiveness of the tree to the western pine beetle. His studies indicate that esters or aldehydes, produced as a by-product of the change in sugar concentrations, may be the source of the attraction to the western pine beetle.

-----#-----

CENTRAL STATES FOREST EXPERIMENT STATION

General

Machines of the gelatine roll type used for multiple duplication of original copies done in ink, type or pencil, have a very useful place in Station work. Using the Beck speedograph with which the Station is equipped, Dr. Auten has found that four colors can be accurately applied to any base map which is uniformly oriented on this sheet. Colors can be reproduced on ordinary bond paper which does not have a gelatine surface.

Oak Yield Study (TS-12)

Work was started in December to determine the relationship of height to diameter of trees on the measured yield plots. This step was needed to permit application of volume tables based on height and diameter of trees to the diameter tally record of yield plots.

The results of the study show that trees in the dominant crown cover in any even-aged stand on the same site, tend to be of one height even though they may vary in diameter. Diameter variation results from variation in density of stocking and the curve of height on diameter is very flat in form. The curve representing the subordinate stand is properly a separate curve for any stand and shows a much smaller increase of diameter with height.

This series of computations has quite definitely determined the influence of the crown class factor in oak stands on the height diameter relationship. The series of curves produced for stands of different heights will be used to guide the drafting of the individual plot curves.

Plantation Study (Fp-1)

Some time was spent in assembling and checking over the data taken in the last two field seasons to arrange it and be sure no data has been lost. It was also considered advisable to make entry on appropriate plot sheets of all photographs which were taken during the last field season. By this means it will be easy to determine whether particular plots have illustrations available or not. Work was continued on the curving of the black walnut stem measurements. Very material progress has been made in checking over the stem measurements for any errors in plotting and computations on these sheets.

Yellow Poplar Study (TS-375)

Dr. B. S. Meyer of the Botany Department and Kellogg are cooperating in the working out of the distribution of yellow poplar in the states north of the Ohio River. In order to secure all data possible on the distribution of this species, circulars are being sent to various botanical agencies to secure any additional information which they may have. Several areas in which this species is not found are becoming apparent and it is planned to delineate these regions as closely as possible. It is hoped that the reason for their existence can be ascertained. There seems to be a possibility of correlation between the morainal systems of glacial drift and the avenues of northward migration of the species following the ice age. In some places lack of moraines has seemed to prevent the species from migrating into that region.

Type Study (T-1)

As a member of the national committee on a forest type classification, McCarthy has begun to assemble a type classification for the central hardwood region. A large number of interested agencies will be given opportunity to assist in this work.

Woodland Grazing (Pa-1)

Work on the compilation and analysis of the sample plot data has been continued during the month. In compiling the data on damage to reproduction by stock, the interesting fact has been repeatedly noted that hardwood sprouts are much more palatable to grazing animals than seedlings. This is particularly true of burr oak, sycamore, chestnut, and black walnut. The seedlings of none of these species are seriously browsed by stock in moderately grazed woods but the sprouts are taken with as much relish as those of slippery elm, yellow poplar, basswood or the ashes.

The completion of the reconnaissance study of this problem last fall opens the way for more intensive work on the specific phases of the problem which were found to be most critical. While there are a number of questions which can only be solved by the use of permanent sample plots, particularly those tied up with the effect of grazing on site factors, it is felt that considerably more work can be done by empirical means before it will be necessary to resort to the costly method of establishing such plots. There are, however, two important problems which the reconnaissance survey indicates cannot be solved except by periodic remeasurements of carefully controlled plots. These are the problems of the effect of grazing on the growth and yield of the stand beyond the reproductive stage, and the possible development of methods of livestock management in farm woods compatible with the production of timber.

-----#-----

LAKE STATES FOREST EXPERIMENT STATION

Perhaps the most significant events in January were the arrival at the Station of O. L. Austin, forest biologist, and R. N. Cunningham, forest economist. Mr. Austin is the representative of the Biological Survey assigned to this region to work primarily on forest biological problems. We anticipate a bad time for the snowshoe rabbits at the forthcoming crest of their cycle about 1932 or 1933.

Mr. Cunningham comes from District 1 with a large experience already gained in forest economic matters. He visited the forest economic organization in Portland to become acquainted with the plans and organization of the Forest Survey so that he is in an excellent position to make plans for the development of the Survey.

Bates, Holmberg, and Moser have continued to be engaged on perfecting the equipment of the seed laboratory, and upon actual seed tests. About January 5, the 50-degree seed-storage room was put in operation, and most of the time since then the 60-degree room has been in use for germination tests held steadily at that temperature. The first test on the best technique for Norway pine has been completed, showing, among the factors involved, only that a steady temperature of 70° was slightly superior to daily oscillation between 60° and 80° F. Variations in moisture of sand between 6 per cent and 10 per cent, slight differences in acidity, and presoaking the seed as against sowing it dry, were without significant effect. Moreover, it has been shown that by properly standardized methods, the probable error of a single test of 500 seed can be kept down to less than 2 per cent. In view of the above results, additional tests which have been started do not involve all of the variables, but only a series of five temperatures to determine whether 70° is close enough to the optimum. This test is mainly on Norway pine but some indications, at least, will be obtained at the same time with a small number of samples of three other species.

Technical Notes on the frost-hardiness test of geographic races of Norway pine seedlings and upon the first year's results from the storage of white pine seed, were issued, as well as a further note describing the seed-testing facilities of the Station. The storage test shows clearly that a ripening process goes on in white pine seed during the first year, and that it then germinates more effectively than when strictly fresh.

Two additional notes on "How much does it cost to thin?" and "How long does hardwood slash remain a fire menace?" were also prepared and distributed.

Some interesting leads as to field technique in the measurement of solar radiation have been suggested by Shirley. When the Clements photometer or some similar instrument which requires a certain length

of time for exposure is used to measure radiation under a forest, the investigator may walk at a uniform rate along certain lines while the paper is being exposed, thus obtaining an average value. With thermopiles, photoelectric cells, and illuminometers, this can not be done. If the same average value is desired, how many readings are required and how should they be made? The following records are suggestive. Forty-one determinations with the Macbeth illuminometer were made at ten-foot intervals along two strips under a 100-year old Norway-white pine stand. On one strip the plate was always shaded from the direct rays of the sun and in the other case it was not. An analysis of the data is given below.

	Mean Per cent of total sunlight	Standard deviation	Standard error	Percentage accuracy	Number of readings required for 5% accuracy
Plate not shaded	22	23	3.6	16.5	446
Plate shaded	27	6	.93	3.4	20

The two methods do not measure the same thing, and it is admitted that flecks of direct sunlight may be highly important to the plant under a canopy. However, the many advantages to be obtained from measuring only diffused radiation seem to offset the objections. The question will be studied in more detail this next field season.

Gevorkiantz, with the assistance of Moser, completed the second-growth white pine yield tables and very nearly finished the manuscript of the publication to be issued by the University of Wisconsin. The yields of white pine in Wisconsin compare well with those belonging to the same site index in New England. They are the same as those obtained by Fenska on white pine plantations grown on loamy sand in Rhode Island, Massachusetts, and New Hampshire. The yields given by Frothingham for fully stocked white pine stands in New Hampshire include bark and hence they appear higher than those given for Wisconsin where only peeled wood was considered. Bark alone will easily account for the differences ranging from 6 to 13 per cent between the yields of the two regions. New England, however, shows a more frequent occurrence of high site indexes than Wisconsin indicating perhaps that white pine there is growing under better conditions of site.

-----#-----

NORTHEASTERN FOREST EXPERIMENT STATION

The winter meeting of the Northeastern Forest Research Council was held in Springfield, Mass., on February 1. At this meeting the needs of the region for research in forest entomology was the principal topic for discussion. The meeting was attended by 11 members of the Research Council; 12 visiting entomologists from the states of the region and the Bureau of Entomology; and 9 others. The discussion emphasized the importance of entomological work in the Northeast and the relatively small amount of study which is being devoted to this field. Particular attention was given to the white pine weevil and it was the consensus of opinion that intensive study of this insect should not be given up until every possibility of prompt control had been exhausted. Based on present knowledge growing of white pine in mixed stands is the method of control which eventually may reduce the serious damage done by this insect. Control by this means, however, is a long time proposition and it was felt that some relief might be secured thru the investigation of attractants to be used in trapping or poisoning the insects, or of the relations of the weevil to birds, mice, and other animals which might feed on it.

At the meeting the desirability of attacking all major problems with the aid of specialists in various lines such as entomology, pathology, and biology was emphasized and a recommendation was made to the Secretary of Agriculture favoring additional work along these lines in the Northeast. The Council also made recommendation to the Secretary of Agriculture for material expansion of the silvicultural work at the station.

Stickel has prepared a progress report covering five years' work on the chestnut replacement plots on the Mount Toby Demonstration Forest of the Massachusetts Agricultural College. These plots were established to study the development of white pine planted on an area formerly bearing a heavy stand of chestnut. Ten years after planting the white pine plots already have as much basal area in pine as the untreated plots have of native hardwoods. Half of the latter is of worthless species. Although the plots indicated that in stands formerly containing a high percentage of chestnut, pine plantations may come through without weeding; yet a complete weeding followed by subsequent selective weeding to keep the pine from being overtopped has greatly stimulated the development of the individual trees.

-----#-----

NORTHERN ROCKY MOUNTAIN FOREST EXPERIMENT STATION

The annual meeting of the Northern Rocky Mountain Investigative Council, held at Spokane, Washington, January 13, 14 and 15, was attended by about 30 delegates from eleven different classes of forest agencies.

In the past, relatively little has been known about the recovery and growth of western white pine when released by logging operations. It is now possible on the basis of some 1100 increment borings taken in the course of the methods-of-cutting study to make the following generalizations about this species:

(1) That white pine does accelerate quite consistently on release by logging - about 80 per cent of the trees bored showed acceleration of some sort.

(2) That this acceleration is of a rather moderate sort, the average tree making about one inch per decade after release, which is a growth about one-third to one-half again as fast as before cutting.

(3) The rate of growth depends in large measure on the degree of liberation, but it is even more affected by crown health. Trees with good healthy crowns will grow two to three times as fast as trees with poor crowns.

(4) Rate of growth also varies considerably with locality. Trees on the deep, fertile soils of the Palouse Division of the St. Joe Forest averaged after release about 1.5 inches per decade against 0.9 inches per decade on the Coeur d'Alene and 0.7 inches per decade on the Pend Oreille.

Available data are sufficient for similar studies for the three most common associates in the white pine forest of this region, and these data are now being compiled and analyzed.

The District 1 lightning storm reports for 1929 were coded during the month by a forest ranger, Floyd Otter, detailed to this work from the Lolo Forest. One interesting point brought out merely by the coding process is that only 2782 observations of storms were made in 1929 by 344 stations, whereas 4502 reports were made in 1928 by 271 stations. This is an average of only 8.1 observations per station in 1929 compared to an average of 16.6 in 1928. Although there were several more short-time emergency lookouts which reported in 1929, this alone cannot account for the marked decrease in average observations per station. The obvious conclusion is that there were decidedly fewer lightning storms in 1929 than in 1928, yet our fire records show 1199 lightning fires in 1929 as compared to 791 in 1928. This again emphasizes the fact previously brought out by the lightning study that

mere occurrence of storms is not a dependable index of danger of lightning fires. And this in turn shows the desirability of determining the relative importance of character of the storms, effects of previous weather on fuel inflammability, etc., so that we may prepare for danger more competently. The characteristics of storms are being accounted for rather satisfactorily, but methods of measuring the weather effects on inflammability, especially the results of prolonged drouth, are not yet developed.

The exceptionally cold weather of the past month has caused considerable difficulty and even privation at the Priest River Branch Station. Thompson reports that Benton Creek froze solid from the mouth to some distance above the water supply dam. This necessitated digging a well and the packing of all water needed both for the residence and the barn. It seems altogether probable that when the pipes thaw out, many will be found broken, because much of the wooden pipe line is known to be decayed to a very weak condition. Fortunately, replacement of the worst sectors was commenced last year and further improvements planned for 1930.

-----#-----

PACIFIC NORTHWEST FOREST EXPERIMENT STATION

Forest Survey

The launching of the Forest Survey in the Douglas fir region received a great impetus early in the month upon the arrival of Senior H. J. Andrews and D. N. Matthews, and with the transfer of District Forester Granger to direct the project nationally. Mr. Granger joined in several conferences on the technic of this project before leaving for Washington. Conferences both among ourselves and with various outside agencies have taken a great deal of time. On January 29 and 30 a conference was called in Portland of the technical man on each National Forest in the Douglas fir region who is to be responsible for preparing the new timber inventory of his National Forest. The tentative working plan, which Mr. Matthews had largely prepared prior to this meeting, was gone over most thoroughly and most points settled.

Material progress has been made in the prosecution of the survey by Cowlin, Moravets, and Briegleb, especially in Washington County, Oregon. The O and C cruises have now been copied for twelve counties, many large owners have been contacted to request permission to copy their cruises and a favorable reply received almost without exception. Five of the very largest owners in northwestern Oregon have thrown their books open to our confidential use and some 60,000 acres of their cruises have been copied. In Washington County permission has been had to use the records of all large owners except one, and he will be seen soon. The ownership lists of the principal owners of timber in western Oregon has

been compiled. It covers every one owning over 1500 acres in any county, and on a single card for each owner is shown the number of acres owned in each county.

Mensuration

Mayer reports that an interesting side light which has come out of the preliminary computations in the western yellow pine growth study is an estimate of the rate of increase of volume on selectively cut stands. The plots sampled were taken in many sections of eastern Oregon, varying in size from one to five acres. They were purposely held small so that the conditions represented would be as uniform as possible. In the following summary no mention is made of the composition of the stand except in so far as the total volume is concerned. Furthermore the site class of the chosen plots is restricted to Site IV.

Original reserve vol. per acre <u>M bd. ft.</u>	Number plots	Number of years in which the volume will be increased by		
		50 per cent <u>Yrs.</u>	100 per cent <u>Yrs.</u>	150 per cent <u>Yrs.</u>
0-1	3	10	16	21
1-2	6	17	29	38
2-3	13	22	34	48
3-4	9	26	42	60
4-5	10	33		
5-6	10	35		
6-10	28	35-45 irregularly		

The heavier the reserve, therefore, the longer is the period in which the volume is progressively increased. Further refinements of analysis may change the values by a slight amount, but on the average they should be indicative of the true condition. Factors such as tree class and application to extensive areas are some of those which are immediately recognized as having some possible influence.

Douglas Fir Natural Reproduction

Douglas fir natural reproduction study compilations are under way. The survival of all age classes of seedlings was found lower in 1929 than it was in 1928, the widest difference being found in the current year's stock. The survival of one-year seedlings this year was 14 per cent as compared with 21 per cent in 1928.

Forestation

In the Fog Belt where seed trees have been found unsatisfactory because of windfall, an effort was made last year to secure reproduction by direct seeding, using the small seeded species, western hemlock, western red cedar, and Sitka spruce, common to the region. These species having from two hundred thousand to five hundred thousand seeds to the pound are less attractive to birds and rodents than the larger seeded species (pines and firs) tried heretofore, and should offer more promise of success. Early in the month last year's seeding tests were duplicated with the idea of checking the survival in different years and under heavier cover development. Abundant germination was found in June on areas seeded last year, and in passing over the plots while doing this year's sowing many seedlings were noted, but snow fell and prevented an accurate check on the season's survival.

Regional Races of Western Yellow Pine

The results of this study to date clearly show that a planted yellow pine seedling, regardless of seed origin, has a real struggle for existence during the establishment stage. The chief difficulties encountered are extreme temperatures, lack of soil moisture, careless planting, and insufficient protection against rodents and grazing animals. It is still too early to compare the growth and survival on a regional basis, but the indications are that the western stock is more vigorous than that from the eastern part of the range.

Phenology

This study affects nearly every member of the staff in some way or other during the year. Simson is responsible for the observations at the Wind River Station, while Isaac is the observer in the upper valley. Director Munger contacts the other observers on the various forests and forest schools during the field season. A six-page progress report was just completed by Kolbe after he had transferred the field records to our cumulative office record cards. The report goes into considerable detail in discussion of the quantity and quality of the data collected the past three years, as no correlations are to be made until after five years. Copies have been sent to all cooperating agencies. However, a few general comparisons are made - for example that bark on Douglas fir, western hemlock, and lowland white fir is peelable at the same time and for a period of four to five months.

Fire Studies

Simson's major projects this month were the preparation of a report on a study of weather and fuel moisture and the lightning study. The 1929 lightning storm reports have been coded. The new form seems to

be taking well with the field but there is still a regrettable tendency on the part of a few of the observers to omit dates and the a.m. and p.m. designations. Over the period 1924 to 1927 inclusive an average of 851 lightning storm reports were received annually; whereas in 1929 there were only 512 reports.

-----#-----

SOUTHERN FOREST EXPERIMENT STATION

General

January marked the arrival of two additional members to the Station staff with the result that at the end of the month but one vacancy remained to be filled, that of Junior Forest Economist. G. H. Lentz, for a number of years Professor of Forest Extension at New York State College of Forestry, Syracuse, reported January 1st to assume charge of the Erosion investigations, as Silviculturist. Lentz spent his sabbatical year in 1928 in Louisiana where he had charge of hardwood investigations for the Louisiana Division of Forestry, working in cooperation with our Station. He comes, therefore, with a year's experience in the South back of him. The Station is also fortunate in obtaining James L. Averell by transfer from the Lake States Station, to fill the Assistant Silviculturist vacancy at Starke caused by Mirov's resignation. Averell is no new comer to the South as he served a six months apprenticeship with the Southern Station as field assistant in 1924-1925.

Naval Stores

The quest for a suitable tack for nailing gutters to turpentine faces continued during the month but no satisfactory tack has yet been found. Various inquiries through correspondence revealed that no uniformity in type and size of tack prevailed for those who have used them in the past. Apparently no one has found a satisfactory tack for the purpose - one that is easily nailed, resists rust, and is readily extracted at the time the gutters are pulled. No doubt the practice of nailing tins rather than securing them in axe cuts will be increased if a tack which meets the requirements can be obtained. Some of the tack manufacturers have recognized this and the American Steel and Wire Company sent a representative to Starke to learn the requirements as to type and size, and as a result are having some special tacks made up for this purpose. Pending the time that these are tried out they are holding up several orders for tacks from naval stores factors.

The fertilized trees were remeasured for growth during this month.

Wyman devoted most of his time to working up material and writing on the naval stores bulletin. Harper spent some time working up the results and preparing a report on the fertilizer experiment. It was found that the nitrogen fertilizer showed the greatest gain in yield, which was about 14 per cent for the two-year period. The phosphoric acid fertilizer showed a gain of 7 per cent over the same period, and potash and phosphate screenings apparently had no effect on the yield.

A turpentine beetle, Buprestis apicans, was found on the Sampson Experimental Area. This is about a month earlier than our records in previous years have shown for the emergence of this species of beetle.

Forestation

Germination tests on 20 lots of seed in sand flats were begun in the New Orleans office. As an innovation this year the individual drills were sowed in separate wire troughs to facilitate later lifting of ungerminated seed for cutting tests.

Gemmer completed the planting of slash pine and a few exotics from the Camp Pinchot nursery and started the new nursery. The first longleaf seed showed excellent germination in from 14 to 20 days during which period some extremely cold weather was experienced.

Erosion

Lentz spent part of the month in familiarizing himself with what had already been done on the erosion project and in reviewing the literature.

Sinclair and Meginnis completed preliminary drafts of the field examination of conditions in several Mississippi Counties.

Near the end of the month the three men returned to southeast Mississippi to clear up points on which data had not been obtained during a previous visit. At Baton Rouge they met men in the Soils and Chemistry Departments and established the groundwork for future cooperation.

Economics

Practically the entire month was taken up with the preparation of the report on "The Financial Aspects of Management of Southern Pine in the Farm Woodlands of Appling County, Georgia." In connection with this report it has been found advisable to review economic data relating to the naval stores industry and related economic and industrial factors. Aside from analyzing the cost production figures obtained in the course of the survey of Appling County, the data on growth, yields and future

turpentine possibilities have also been compiled. It was found that most naval stores operations in Appling County showed a deficit in 1929, although second-growth farm timber had a net annual rental of about one dollar per acre. Over the period from 1921 to 1929 the maximum timber realization value (rental plus profit) appears to have been about \$2.20 per acre.

-----#-----

SOUTHWESTERN FOREST EXPERIMENT STATION

A set of 30 western yellow pine cores was collected for Prof. Sampson of the University of California for study by his class in forest ecology. The object is to correlate radial growth with physical factors. The cores were taken from trees within a few hundred yards of the Fort Valley weather station. Records of monthly precipitation, mean maximum, mean minimum and mean temperature by years from 1909 to 1929 were also forwarded. A similar study by Pearson in 1918 showed a striking relation between precipitation and height growth, but diameter growth was less consistent. It is probable that temperature must also be considered.

Krauch has made some interesting and useful compilations of mortality in cutover stands of western yellow pine, based on 15 and 20 year records on sample plots on the Coconino and Tusayan. Mortality is the greatest element of uncertainty in predicting yields in the Southwest. Fairly accurate determinations of the rate of diameter growth can be made with an increment borer, but without reliable figures on mortality the best calculations may go wrong. The results here summarized are based on 5-year measurements on 5 plots. The two oldest plots were established in 1909, and they are also the largest, covering 304 and 456 acres. Three plots established in 1913 measure 112, 139 and 152 acres respectively. The stands per acre after cutting ranged from 1873 to 4510 feet B. M.; the number of trees above 12 inches dbh. ranged from 3.8 to 13.7 and the diameters up to 47 inches. The following are some of the significant results.

Average annual losses per acre on the two 20-year old plots are 8.8 and 20.3 feet B. M., representing annual mortality per cents of 0.36 and 0.58, respectively. On the three 15-year old plots, the average annual loss per acre is 17.7, 19.8 and 29.1 feet B. M., and the corresponding percentages are 0.62, 1.06 and 0.65.

As is to be expected, trees above 30 inches dbh. show the highest mortality rate both as to number and volume. One area proved an exception to the rule, in that the rate was high for the 20 - 30 inch trees than for the 31 - 40 inch trees.

There is no marked consistency in the loss during different 5-year periods after cutting. The two 20-year plots show a progressive increase from the first to the fourth period. Of the three 15-year plots, two suffered the greatest loss in the first and one in the third period.

A classification of dead trees by causes gives variable results when the different plots are compared. Basing the percentual distribution upon number of trees killed, mistletoe ranks highest on all but one of the plots. The percentages attributed to this agent on the five plots are: twenty year plots, 0 and 55; fifteen year plots, 48, 29 and 46. Corresponding values for windthrow and wind breakage are 19, 15, 18, 30 and 26 per cent. Lightning ranks third with percentages ranging from 5 to 13. In point of volume, wind is responsible for the greatest loss, followed by lightning, because both of these agents affect mainly large trees. Mistletoe, on the other hand, kills relatively few large trees.

-----#-----

BRANCH OF RESEARCH - DISTRICT 2

January Activities

During the early part of the month, Roeser completed the Experiment Station section of the annual investigative report and program. He also prepared diagrams for the final report on the heat resistance experiment, which will be submitted this month.

Based upon additional volumetric measurements procured last season on the West and East Dunoir lodgepole pine plots in the Washakie cutting methods project, the original local volume tables were revised. Volume tables were prepared for the Lake Creek and Hay Creek lodgepole pine plots in the same project. These are located in the Foxpark region of the Medicine Bow Forest. Material procured when the plots were installed in 1923 and 1924 constituted the basis for the latter tables.

A start was made during the month in the task of compiling the balance of the soil moisture records obtained at Tremont in the type study between 1925 and 1929, inclusive. It is expected that all of these records will be tabulated and summarized before the beginning of the next field season.

The District Investigative Committee convened in Denver on January 30, 31, and February 1. The Committee was the largest to ever consider a program in District 2, and besides the District office members, included three Supervisors, four representatives from the forestry schools of Colorado College and Colo. Agricultural College, and the technical staff of the Central Great Plains Field Station

(for part of the sessions.) On the first day, the entire time was given to considering and selecting areas desirable for withdrawal as research reserves. On the 31st, the Experiment Station report and program were reviewed, likewise those of the Office of Grazing. Administrative projects involving nursery and planting practice, protection studies, and the camera point study were considered on the morning of the last day.

Forest Ranger G. L. Varney reported for temporary duty at the Experiment Station on January 1. He was assigned to work with Ranger J. C. Leadbeater in tabulating and compiling sample management plot records. To begin with, the data worked up last year for the Arapaho cutting plots in the spruce-alpine fir type were rechecked. Following this task, stand tables were prepared and periodic growth data computed for four blocks of seventeen lodgepole pine thinning plots in mature and sapling Medicine Bow stands. This work was not completed until shortly after February 1.

February Plans

The various project memoranda in the Investigative Report will be sent to the Supervisors concerned along with other instructions where these are necessary, as soon as possible after the Investigative Report is submitted to the Forester. Working plans will either have to be revised or prepared for the proposed spruce-type thinning study on the Montezuma Forest, the brush disposal experiment on the Black Hills Forest and the Douglas fir seed production and western yellow pine seed source studies at Fremont and on the Nebraska Forest respectively.

Cutting and thinning plot records to be worked up during the month include those for Blocks A, B, and C in sapling and mature Washakie lodgepole pine stands, and for five Holy Cross plots in the spruce-alpine fir type.

-----#-----

MANUSCRIPTS

Pacific Northwest District

Test of Planting Methods in the Douglas Fir Region of the Pacific Northwest, J. F. Kummel, Manuscript report, July 15, 1929.

Influence of Various Site Factors on the Success of Planting in the Douglas Fir Region of the Pacific Northwest, J. F. Kummel, July 17, 1929.

Final Report - Fall Planting of Douglas Fir on the West Side of the Cascades, J. F. Kummel, May 15, 1928.

Final Report - Suitability of Seedling Stock in Douglas Fir Planting, J. F. Kummel, May 21, 1928.

Suitability of Douglas Fir Planting Stock as Affected by Source of Seed and Age Class, J. F. Kummel, July 28, 1929.

Direct Seeding of Douglas Fir on the National Forests in the Douglas Fir Region, J. F. Kummel, January 17, 1930.

Seedling Mortality and the Restocking of Douglas Fir Logged-Off Land, Leo A. Isaac, (For Annual Cruise of Forest School, Ore. State Col.)

California

Pilgrim Creek Yield Plot, Shasta National Forest. Progress Report. S. B. Shaw, Nov. 15, 1929.

Appalachian

Advantages of Selective Logging. E. H. Frothingham (For Virginia Commercial Forestry Conference)

IN PRINT

Frothingham, E. H. Value of Federation's Forest Products Emphasized. (Farmer's Federation News, Jan. 1930)

Haasis, F. W. Forest Plantations at Biltmore, N. C. Misc. Pub. 61.

Marshall, Robert. The Problem of the Wilderness. Scientific Monthly. February, 1930.

Munger, T. T. National Forest Resource Survey. The Timberman, December, 1929.

Wakeley, P. W. Preliminary Observations on the Pine Tip Moth (Rhyacionia frustrana Comst.) on Southern Pines. (International Congress of Entomology, Ithaca, August, 1928)

Zon, R. and R. G. Garver. Selective Logging in the Northern Hardwoods of the Lake States. Tech. Bul. 164

-----#-----

FOREST PRODUCTS - District One

Western White Pine Stumpage Values Again on the Increase

The following tabulation compiled at the request of Assistant Secretary of the Interior J. Dixon, showing the stumpage value (Forest Service sales) of Idaho white pine from 1908 to 1929 is of interest:

<u>Year</u>	<u>Stumpage price per M feet</u>	<u>Year</u>	<u>Stumpage price per M feet</u>
1908	\$4.00	1920	\$5.21
1909	4.00	1921	4.91
1910	4.00	1922	6.08
1911	4.00	1923	8.88
1912	4.42	1924	7.02
1913	4.40	1925	6.86
1914	4.08	1926	5.28
1915	3.10	1927	4.39
1916	3.71	1928	4.03
1917	4.06	1929	4.25

The above stumpage prices were obtained by averaging a fair number of representative Forest Service sales in each year. The Forest Service obtained its best price for Idaho white pine in 1923. The stumpage values increased from a low of \$3.10 per M in 1915 to a high of \$8.88 in 1923. Idaho white pine stumpage was sold by the Forest Service for \$4.00 per M in 1908 and for \$4.03 in 1928. An increase to \$4.25 is shown in 1929. It is expected that there will be a slight increase in 1930. The high single sale price was reached in 1923 when 56 M feet were sold for \$14.25 per M. A larger sale of some 17,000 M feet sold for \$12.40 per M during the same year. Both sales were made on the Coeur d'Alene Forest.

D-1 Investigative Council Meets in Spokane, Washington, January 13 to 15.

Members of the D-1 Investigative Council met January 13 to 15, inclusive, at Spokane, Washington. This is the first time that the meeting has been held outside of Missoula. The following organizations were represented at the meeting: U. S. Forest Service, Bureau of Plant Industry (Blister Rust Control), Bureau of Entomology, Weather Bureau, Canadian Forest Service, Forest Schools of Montana and Idaho, Indian Service, the firm of Mason and Stevens, the Western Forestry and Conservation Commission, the Idaho State Forester's Office, Potlatch Timber Protective Association and the Clearwater Timber Company. District Forester Evan W. Kelley was chairman of the meeting. Bradner attended the meeting as the representative of the D-1 Office of Products. The meeting was adjudged one of the most interesting and successful yet held.

Better Woods Utilization Subject for Discussion at S.A.F. Meeting

What is being done in Products Research to bridge the gap between the present and the best possible utilization of wood was the subject for discussion at a Section meeting of the Society of American Foresters held at Spokane, January 13. Mr. Bayne, Chairman of the Forest Products Committee of the Spokane Chamber of Commerce, based his talk on a survey of the secondary wood-using industries in Spokane and gave some of the results obtained. Mr. Bradner told of the work in Products Research being carried on by the Forest Products Laboratory, the Washington Office and the District Products Office and enumerated some of the present possibilities for the reduction and utilization of wood waste in the Inland Empire. Dr. Hubert of the Idaho School of Forestry and Prof. Ramskill of the Montana School of Forestry told briefly of the work in Products Research that was being carried on at their respective schools.

Fire Depreciation Study

Field work on this study was done in 1927 but due to the necessity of giving the tree studies and others priority the office compilation and analysis has lagged. It is expected that the final presentation will be made sometime during the next month. The following tabulation shows the depreciation in lumber selling value on a lumber tally basis for the total run of logs, 1927 average. Idaho white pine selling values were applied in the comparison to the mill scale data obtained in 1925 at the same mill. The 1927 prices were, of course, applied to the 1925 run. Logs from the burned areas were scaled as sound or containing fire defect and eliminating all normal defect from the comparison. To date the analysis has indicated that the scaler was unable to determine accurately whether or not a two-year old fire-damaged log was sound or not, principally because of worm holes. The one-year-old sound logs from fire areas compared very favorably in lumber yield and lumber selling value with the sound log run of 1925.

	: Sound and Fire :			: Defective :			: Sound Only :			: Fire Defective :		
	Logs	Over-	Selling	Logs	Over-	Selling	Logs	Over-	Selling	Logs	Over-	Selling
Year	per M:	run	%:Value	per M	run	%:value	per M	run	%:value	per M	run	%: Value
	Based:	3 Com:	Lumber	Based	3 Com	Lumber	Based	3 Com	Lumber	Based	3 Com	Lumber
	on	& Btr:	tally	on	& Btr:	tally	on	& Btr:	Tally	on	& Btr:	Tally
	Gross:		:\$	Gross		:\$	Gross		:\$	Gross		:\$
	Scale:		per M	Scale		per M	Scale		per M	Scale		per M
1925	:	:	:	:	:	:	:	:	:	:	:	:
Mill	:	:	:	:	:	:	:	:	:	:	:	:
Scale	: 9.1	: 17.	: \$37.24	: 9.1	: 17.	: \$37.24	: 9.1	: 17.	: \$37.24	: 9.1	: 17.	: \$37.24
Sound	:	:	:	:	:	:	:	:	:	:	:	:
Green	:	:	:	:	:	:	:	:	:	:	:	:
Cut logs:	:	:	:	:	:	:	:	:	:	:	:	:
1925	:	:	:	:	:	:	:	:	:	:	:	:
Fire logs:	5.2	: 4.2	: 31.67	: 8.4	: 2.8	: 34.05	: 4.6	: 5.8	: 30.71			
Loss	:	:	: 5.57	:	:	: 3.19	:	:	: 6.53			
1926	: 10.1	: 17.9	: 38.19	: 11.1	: 13.7	: 37.64	: 8.1	: 21.8	: 32.75			
Fire logs	:	:	:	:	:	:	:	:	:	:	:	:

The 1925 fire killed logs run 5.2 logs per M compared to 9.1 logs per M for the 1925 sound green cut mill scale logs. The bigger log run would no doubt have had a greater selling value were it not for the fire damage. Therefore, the loss of \$5.57 is no doubt somewhat low for a log run of this size. The final comparison and analysis which is being made by Mr. Anderson at the present time will show the depreciation in value for log runs from 6 to 14 logs per M and will be based upon the depreciation by log diameter classes which carry their respective weights within each log run. Figures of this nature are much in demand at the present time by both the Forest Service and the lumber industry of the Inland Empire.

Preliminary Work on Census of Lumber and Timber Products

Preparations for the 1929 canvass of Montana and Idaho were started early in the month. The new mailing lists compiled from various sources of information, such as previous census records, reports from all Forest Supervisors and a directory maintained by the Four L Lumber News, show approximately 800 lumber and timber products manufacturers for the two States. An unusually large number of transfers of ownership and other changes were reported by the Forest Supervisors. The addresses of 150 new operators were obtained from the District One Supervisors' reports.

Recommendations were made to the Bureau of the Census for the appointment of six new special agents who are Forest officers connected with the Blackfoot, Cabinet, Clearwater, St. Joe, Pend Oreille and Kaniksu Forests. It is expected to have these men assist with the clean-up work after most of the returns have been secured by mail.

It was planned to mail all first requests before the end of January but this action could not be taken because of a shortage in the list of material to be furnished by the Bureau of the Census. A supply of the large form W. S. Lumber Schedule was not included with the other forms, letters of transmittal, etc., received at the District Office about January 22. This shortage was reported to the Forester by wire on January 25 and it is hoped that mailing can be started during the present week.

Lumber Prices and Movement

Av. Mill-Run Prices	Annual, 1928	1st Q. 1929	2nd Q. 1929	3rd Q. 1929	Dec. 1929
Idaho White Pine	\$31.09	\$32.13	\$35.22	\$34.88	\$35.01
Western Yellow Pine	24.51	26.18	26.61	26.51	24.56
Larch-Fir	18.55	20.81	20.85	20.68	17.41
White Fir	18.26	20.53	22.18	20.41	21.15
Spruce	23.20	22.66	25.92	24.91	24.15

Shipment and Cut

December, 1928December, 1929

Shipment

112,336

95,113

Cut

108,847

111,803

Annual, 1928Annual, 1929

Shipment

1,739,985

1,761,184

Cut

1,655,358

1,825,470

-----#-----

FOREST PRODUCTS - District 6.Branch of Research

Messrs. Bateman and Wirka of the Laboratory, after attending the annual meeting of the National Wood Preservers' Association, spent a day at Portland. The Office of Operation took advantage of their visit to clear up certain points that had come up in connection with the treating of poles to be installed in national forest telephone lines. Bateman, Wirka and Gibbons, accompanied by several officers of the Portland Electric Power Company, inspected one of the company's pole installations near Portland, also a post installation, in which the preservative in dry form had been inserted into bored holes. The Douglas fir posts after 18 years were in fairly good condition. The preservative consisted of 2 parts of corrosive sublimate, 4 parts of arsenic, and 15 parts of salt.

Felling and Bucking Study - Spelman completed a report dealing with his observations on log scaling and grading in the Douglas fir region. The report is written largely from the standpoint of the variations in log scaling and grading practice, an understanding of which is necessary in the appraisal of low-grade and broken material in the woods.

In connection with a logging and milling study being conducted by the forestry department of the Long-Bell Lumber Company, the office through Spelman, extended some assistance. In the milling phase of the study Spelman scaled some of the study logs in accordance with Forest Service practice and graded them on the basis of some tentative standards which he intends to use in connection with his felling and bucking study. In the logging phase of the study, he is assisting with the felling and bucking time studies.

Survey of Sawmill Waste in the Douglas Fir Region - Hodgson spent the first part of January in the field making final preparations for the study of four hemlock mills, the field work of which will begin about the 17th of February. Aside from making a very satisfactory division of the

field work, the experience gained at these comparatively simple hemlock mills will be of value in conducting the work in the more complicated Douglas fir sawmills next fall.

The possibilities in salvaging sawmill waste is suggested by a few figures picked up by Hodgson on his recent trip in Washington. The International Wood and Sulphite Company of Seattle, operating in the Puget Sound and Grays Harbor regions, makes from sawmill waste and distributes to the pulp and paper mills owned by the Crown-Zellerbach and the Mills interests, 450,000 units of pulp chips and 200,000 units of hogged fuel per year (a "unit" is equal to 200 cubic feet). It is estimated that about 500 board feet of solid wood is required to make a unit of pulp chips, also that the heating value of a unit of hogged fuel is equal to that of one-half barrel of crude oil. Upon this basis it would take 225,000,000 feet of logs and 100,000 barrels of crude oil per year to meet the requirements of this company. The interesting thing about this operation is that practically all of the pulp chips and all of the hogged fuel are derived from sawmill waste, which only a short time ago was destroyed in the sawmill refuse burners.

Little-Used Species - Johnson finished his report "Utilization of Bigleaf Maple of the Pacific Northwest". Within the next two or three days it will be submitted to the Washington office and Laboratory for review. How it is to be published has not been decided, but it is hoped that it can appear as a Department bulletin.

Air-Seasoning Lecture - During the second week of February the School of Forestry, Oregon State College, Corvallis, Oregon, is giving a kiln-drying course for small sawmill operators, with A. C. Knauss, Oregon-American Lumber Company, the principal lecturer. One lecture, however, which will deal with air-seasoning in the Douglas fir region, is to be given by Johnson of this office.

Cooperation with Bureau of the Census - The first request, which included 2750 names, was mailed out during the month. On the basis of the principal schedule, editing alone will represent one big job.

Publications - To supply information which will assist consumers in determining the suitability of western hemlock for specific uses, is the purpose of Department of Agriculture Technical Bulletin No. 139, "Properties of Western Hemlock and Their Relation to Uses of the Wood" by R.P.A. Johnson of the Laboratory and W. H. Gibbons of the local office, distributed by the Government printer during the month.

The Pacific Pulp and Paper Industry supplied this office with 2250 reprints of Hodgson's report "Logging Waste in the Douglas Fir Region" including his supplemental report "Unutilized Trees Left After Logging in the Douglas Fir Region".

-----#-----

FOREST TAXATION INQUIRY

Progress Report No. 6 was completed and sent to Washington for multigraphing. It is entitled "Assessment Ratios of Rural Real Estate in Oregon and Washington" by Daniel Pingree and R. C. Hall.

Herbert gave an address on forest taxation before the Fourth Rhode Island Agricultural Conference at Providence on January 9. He reports a great deal of interest in the subject of forestry and particularly in forest taxation, in spite of the fact that Rhode Island is primarily an industrial state.

Final arrangements have been made with Professor Paul W. Wagner of the University of North Carolina to join the staff of the Inquiry on February 1 as a temporary taxation economist. Professor Wager is an authority on county government, having written a book on that subject with particular reference to conditions in North Carolina which has been well received. He will have the field direction of the Inquiry's forest taxation study in North Carolina.

Some interesting materials on taxation in France were received from Professor Robert M. Haig of Columbia University, who is representing the Inquiry in Europe on a part time basis. The following paragraphs are quoted from his recent preliminary report on French conditions:

"France, of course, has a very large area in forests (about 19%), and nearly two-thirds of the forests are privately owned. Those privately-owned forests are predominately in small parcels. According to Mr. Jagerschmidt, 1,400,000 owners possess less than 10 hectares. There are, however, 3,300 owners with more than 200 hectares. But only one or two own tracts as large as 5,000 hectares.

"The rate of return on private investments in forests in France is said to be very low. To a very considerable extent forests are luxuries of the rich. For example, it is considered 'smart' to own a hunting preserve. Mr. Colomb stated that a forest is usually a 'propriété de luxe.' Mr. Quercy said that the present taxes on forests were really old ones which had been evolved on the assumption that forests were pleasure grounds. Moreover, the national importance of wooded areas seems to be widely appreciated and individuals who preserve them receive a certain psychic income as public benefactors. The existence of the vast tracts of publicly-owned forests, whose normal product is commercially sold but with little or no success from the point of view of adequacy of return on the outlay or cost, may be a factor in depressing the yield of the private undertakings. On the whole, however, private forestry in France seems, from the commercial point of view, to be an economic freak. It continues to thrive on a direct money return which would appear to be quite inadequate.

"It is particularly interesting that in both France and the United States blame for deforestation (or what the French term

les exploitations abusives) is placed at the door of the tax system, but that the tax which is supposed to be the cause of the trouble with us is a property tax which is payable annually until the cut is made and then ceases, whereas the tax which is supposed to be the cause of the trouble in France is the transfer tax, which is payable only occasionally when title is alienated. The foresters agree that the annual tax (impôt foncier) is insignificant. But it is the taxes which apply when the forest is sold, is given away, or is bequeathed, that are 'causing the destruction of the forests.' The explanation is to be found in part in the weight of these taxes, which are ordinarily too heavy to be paid from one year's normal yield, and in part in certain illogical and inconsistent distinctions rooted deep in the French jurisprudence."

-----#-----

RANGE RESEARCH

WASHINGTON

Range Research in the Public Domain Problem

Included in the Forest Service material submitted to Chairman Garfield of the Public Domain Commission was a short statement on the place of range research in the public domain problem. In addition to emphasizing the importance of the problem the far-reaching economic and social consequences resulting from the unsatisfactory conditions and the cause of these conditions were outlined. The principles of range management which have been developed by the Forest Service research and the value of this work on the National Forests, as well as the possibility of comparable benefits from similar studies on the public domain, were given.

Campbell on Detail

On January 31, Mr. R. S. Campbell of the Jornada Range Reserve reported to the Washington office for a detail of approximately four months. He has been included as an author of the Jornada grazing capacity report. His principal work will be to extend the analysis of the data worked up by Schoeller to cover the four drought-years, July 1921 to June 1925. The revision will be on a basis of at least ten years data from July 1915 to June 1925, inclusive. The period since 1915 has seen the grazing capacity drop from the maximum then prevailing as a result of drought, rebound somewhat and drop again. Since 1925 the grazing capacity has largely been reestablished. The analysis will show the fluctuation of grazing capacity on the Jornada, the factors causing such fluctuation, and the adjustments in numbers of stock necessary to overcome losses resulting from drought conditions.

Campbell is also to analyze some additional data for inclusion in his paper covering plant succession on clay soils in southern New Mexico. The Jornada snakeweed study data will be checked for the preparation of a progress report covering the first five years' results.

It is planned for Campbell to spend at least a month assisting Chapline in the more important work in range research, thus serving the dual purpose of pushing the work along and gathering valuable experience in the Washington office procedure.

Ingram's Locoweed Report

The Bureau of Animal Industry has sent us a copy of the late Mr. D. C. Ingram's "Report of Locoweed Situation in Presidio, Jeff Davis, and Reeves Counties, Texas." It seems to us that Mr. Ingram accomplished a good deal in the few weeks available for his survey. His

management suggestions to stockmen relative to pasture rotation and change in salting methods seem excellent. The need for further studies of this problem is stressed. There is much that is suggestive of thought in Ingram's report - such as the author's correlation of abundance of locoweed with yearlong grazing use and lack of vegetation; the mortality of calves in bad loco years, and the scarcity of succulent feed in spring with increased losses.

Division of Forage Crops Studies Field Methods

On January 11th Dayton attended a conference in Mr. Kephart's office, Bureau of Plant Industry, on field study methods applicable to pasture conditions. On account of Mr. Kephart's indisposition the meeting was presided over by Mr. Vinall. Attending field men in the division of forage crops are much interested in the quadrat studies being made by the Forest Service, and asked a good many questions about them. They seemed to feel that there is a great need for standardization of ecological nomenclature.

Visitors

Among visitors who dropped into the office to consider range research were Mr. F. E. Mollin, Secretary of the American National Livestock Association, Assistant Supervisor A. D. Moir of the Lewis and Clark and Mr. L. J. Palmer in charge of Reindeer Investigations with the Biological Survey in Alaska. Mr. Palmer is spending several months in Washington this winter preparing a Farmers' Bulletin on results of his reindeer investigations and lining up his plans for research in the domestication of the musk ox and the mountain, or bighorn, sheep. The musk ox was a native of Alaska but was exterminated about 40 years ago and the Bureau plans to reintroduce them from Greenland. The mountain sheep is an excellent meat-animal and since they have become quite tame in the McKinley National Park it is hoped that they can be readily domesticated. The Biological Survey is following the plan of developing industries which are adequately adapted to the climatic and other conditions of interior Alaska, rather than attempting to introduce domestic livestock which might not be so well adapted to the conditions in the territory.

Good News From the Southwest

Mr. Basil Wales of Albuquerque in a recent letter has the following comment on precipitation which indicates a good water supply for this next year:

"Things are going along fine here. The Arizona Forests (including the entire Salt River watershed) have finally gotten some

real moisture - over $2\frac{1}{2}$ inches of rain at Roosevelt in 72 hours, 30 inches of snow at Payson, over 4 feet at Long Valley and 4 feet at Flagstaff and Williams. Lots of snow also in the White Mountains and at McNary. Good snows over most of New Mexico, too."

"On A Thousand Hills" Available

The one-reel movie outlining the fundamentals of range management on sheep range in the West has just been released by the Office of Motion Pictures. This film was largely taken in Utah and Idaho under the auspices of District 4. It is believed that it should serve a very definite need for bringing home to stockmen some of the more important principles of sheep range management.

FORAGE INVESTIGATIONS

"Glossary" Rounds Another Lap

Hunn finished his review of the glossary of common botanical terms, and points at issue between him and Dayton were settled; pages necessary to be recopied have been recopied, and the mss. is now on Chapline's desk for approval.

Tidestrom Monographing Spruces

Mr. Ivar Tidestrom asked Dayton to look over and criticize a monograph of the spruces of the world which he has prepared; this has been done.

Copies of Mexican Milkweed Bulletin Available

Research members of the Service concerned with poisonous plants and many administrative men may be interested to know that the Bureau of Animal Industry reports that it has still available for distribution 1300 copies of Doctors Marsh & Clawson's "The Mexican Whorled Milkweed (Asclepias mexicana) as a Poisonous Plant" (Dept. Bul. 969). This plant occurs in Districts 1, 3, 4, 5, and 6.

Plant Identification

Two collections, representing 178 plants, were reported out to the field in January, with 21 photostatic prints of notes-cards. One collection of 51 specimens was sent to the Bureau of Plant Industry for formal determination. 161 plants were mounted for the herbarium. Ranger Nathan C. Schulze's collection of Arabis depauperata, and Ranger

Jesse Olsen's collection of Streptanthus wyomingensis, mark what appear to be two additions to the known flora of the State of Idaho, and extensions of range for these two crucifers.

-----#-----

GREAT BASIN

General

Field Assistant Gordon Merrick left the station shortly before Christmas. After spending Christmas at Chicago he expected to report for work at the Jornada. Charles Connaughton was appointed temporary Assistant Compiler in December.

Associate Range Examiner Renner, early in January, completed the compilation of the erosion data gathered by the range erosion survey party on a portion of the Boise River watershed. He reported in Ogden on January 11 for a detail to the station headquarters.

Assistant Range Examiner Craddock is devoting most of his time to a compilation of seven years data on the spring-fall range project at the U. S. Sheep Experiment Station.

Nelson spent the past two months on his black grama manuscript. It is nearing completion.

Watts has practically completed his analysis of the available climate and streamflow records for the Boise River watershed.

The District Investigative Committee meeting was held in the District Forester's Office on January 20, 21 and 22. It was attended by men from each branch in the District office, several forest supervisors and six men from the Utah State Agricultural College in addition to the Station force. More and more interest is being shown in this meeting each year and this meeting is the best held to date.

In

Influence Study in Southern Idaho

Climate and Streamflow Studies - The importance of the waters of the Boise River is brought out by the fact that these waters are used to irrigate approximately 345,000 acres of highly productive farm lands in Boise Valley. Irregularities in streamflow, whatever the cause may be, creates a considerable problem.

The mean annual flow from the drainage for the 34 years of record has been 2,132,000 acre-feet and it is estimated that the average demand for irrigation is about 1,750,000 acre-feet. During the 34-year period the total annual flow of the river has fallen below 1,750,000 acre-feet.

10 times. Thus a definite water shortage may be expected one year in 3.4 years. Additional difficulties may be expected due to irregularities in the date of flood flow. At any time during the irrigation season when the natural flow of the river falls below 4400 second-feet, it is necessary to draw on storage water to meet the demand if storage is available. It so happens that 4400 second-feet is about the normal flow of the river on July 1, and it also has been found that late summer water will be short when the 4400 second-feet stage comes at any considerable time prior to July 1. Approximately 87.6% of the annual streamflow on the average occurs between October 1 and July 1, and 12.4% comes during the remaining three months of each 12-month period. The storage capacity of the reservoir is 280,000 acre-feet in Arrowrock and 170,000 acre-feet in Dear Flat.

The stream gauging records establish the fact that both the date of peak flow and the date at which the river recedes to the 4400 second-feet stage has generally been occurring earlier than average during the past 10 years. Obviously the time element, as well as water shortage in any year, could be removed if the watershed were provided with enough additional reservoirs to store the early peak flow and the excess in high years.

Along with the advance in the date of spring flood has come serious deterioration of a large part of the range on the watershed, both within and without the Boise National Forest, this in spite of material reductions in numbers of stock. With range deterioration has come destructive erosion over considerable part of the drainage.

With these conditions in mind considerable time has been devoted to an analysis of existing weather and streamflow data.

Unfortunately very little precipitation data for the watershed proper are available. Fragmentary, short time records have been kept for several stations, none of which is above 5500 feet elevation. The only record really usable is that of Boise, Idaho, which is continuous from 1869 and partial for a few years prior to 1869. The Boise data have been compared to that of the other stations on the watershed and may be said to be a fair indicator of watershed precipitation. In all analysis of precipitation, the October 1 to September 30 year was used.

The following expresses the findings for yearlong precipitation at Boise:

1869 to 1929 average		13.41"	
*1869 " 1911	"	13.78"	100%
1912 " 1917	"	14.43"	105%
1918 " 1923	"	12.29"	 89%
1924 " 1929	"	11.75"	 85%

* Period prior to construction of Arrowrock Dam.

During the past 11 years the precipitation has fallen below 13.78" eight times, dropping as low as 7.36" in 1924. Beginning with and prior to 1918, there were 13 years during which the precipitation fell below 13" only once and on that year it was 12.25".

Spring (April 1 to June 30) precipitation has shown an even larger deficit:

65-year average	= 3.51"	100%
36 "	= 3.42"	 97.4%
11 "	= 2.68"	 76.3%
6 "	= 2.30"	 65.5%

Ten of the last twelve and all of the last six years have been below normal.

In plotting the data by years and by using a 7-year moving average, it appears that the precipitation occurs in irregular cycles of about 14 years. The variations are so numerous, however, as to leave this assumption open to serious question.

A warm, early spring, with its resultant early and high flood, tends to exaggerate the rather acute situation with respect to early peak flow and flashiness of runoff. An analysis of spring temperatures indicates that on the average temperature conditions are changing little, if any. Yearly fluctuations are large and no trends have been uncovered.

Statements as to the advance of the date of peak flow and of recession to 4400 second-feet are substantiated. However, a comparison between the Middle Fork and South Fork of the Boise, and between the Boise River and the Payette River shows very similar conditions.

There is considerable evidence to substantiate the belief that the Boise River has become more flashy in its discharge but the real facts in the case can not be determined from existing records.

Erosion Study on the Boise River Watershed

The survey party covered approximately 128,000 acres the past season, collecting, in addition to the usual grazing survey data, detailed information on the extent and seriousness of the erosion situation. In classifying the area as to the degree of erosion, five "erosion types" were recognized. Briefly, they are as follows:

1. Areas showing no erosion.
2. Areas starting to erode; some creep and gully erosion.
3. Areas quite bad; usually bad gullies in the "bottoms"; creep and shoestring erosion over entire area.

4. Areas supporting very little vegetation; very bad gullies, and sheet, pencil, and shoestring erosion over entire area.
5. Areas badly overgrazed with but little sheet erosion or very little or no pencil erosion.

The results of the survey show that for the area covered 21.7 per cent falls in erosion type number 1, 56.0 per cent in number 2, 15.0 per cent in number 3, 2.1 per cent in number 4, and 4.8 per cent in type number 5.

In addition to classifying the 128,000 acres into "erosion types", rather complete notes were taken on the condition and character of the soil, the degree of slope, and the seriousness of the rodent infestation for each type. This information, together with the usual grazing survey data as to type and density of the forage, degree of accessibility, etc., was prepared for classification and analysis in the punch card machine. The results of this analysis are expected to indicate under what conditions erosion of varying degree is taking place and should furnish an indication of the methods to be followed in management to correct the situation.

Ten gridiron or sheet and minor gully erosion plots were established by precise engineering methods on selected areas having different conditions of slope, cover, and erosion. Profiles, which will be remeasured at intervals, were taken on each of these areas. In addition, a careful reconnaissance of the present vegetative cover was made. This reconnaissance will also be repeated, probably each year. This study should furnish a fair measure of the rate of revegetation and checking of erosion, or of further erosion, under different conditions of grazing use.

A series of water samples were taken at 3-4 day intervals to obtain a preliminary estimate of the amount of silt being carried through the Arrowrock Dam by the Boise River during the sluicing period. The results indicate that the suspended load of the river for the 53-day sluicing period was 200,140 tons. The samples were taken mainly toward the end of the sluicing period when the river was believed to be carrying its maximum load. The above figure is, however, believed to be conservative for the entire period since it represents only the suspended load, there being no known method of measuring the bed-load.

Spring-Fall Range Project

Compilation of seven years records secured at the U. S. Sheep Experiment station near Dubois, Idaho, is nearing completion and it is expected that a cooperative progress report covering both management and vegetative phases of the spring-fall range project will be finished this spring. Although the studies of vegetation have not yet been completely analyzed, the records to date show unmistakable trends

in forage production as influenced by various intensities of grazing. When these trends are systematically substantiated by a correlation of all of the data at hand it should be possible to set up rather definite recommendations for the economic use of the spring-fall range.

In preparing the progress report it is anticipated that the analysis of the data will point to needed refinements in field technique and to new phases of the grazing problem which should be investigated. In this respect there is urgent need for more adequate and accurate methods of isolating and evaluating the influence of climate on the vegetative cover so that grazing influence can be clearly recognized.

Climate and Plant Growth During 1929

Climatic conditions during the past growing season were very favorable for forage growth in most of Utah.

Winter and early spring precipitation at the Great Basin field station on the Wasatch Plateau from November 1, 1928 to April 30, 1929, was unusually high, in fact, the best since the winter of 1926-1927. This was followed by slightly below-average precipitation during May but better than average during June. During July the precipitation occurred in form of light showers, but often enough to keep the vegetation growing. August was a rather wet month in the two lower zones and average in the spruce-fir zone. Heavy precipitation continued during the first ten days of September with a heavy wet snow occurring in the higher elevations.

The beginning of growth in the oak, aspen-fir and spruce-fir zones was delayed by low temperatures from 12 to 20 days later than the average. In spite of the late start, vegetational readiness of the principal forage plants, except in the spruce-fir zone, was not delayed beyond the average date for the period 1925-1928. Growth was consistently good throughout the growing season and was not retarded during the earlier months by any prolonged cold spells. There was practically no seed maturity of grasses at the higher elevations because of the early storms in September followed by freezing temperatures. Better weather conditions followed the September cold spell and resulted in good aftermath growth in the oak and aspen-fir zones.

Forage yields were exceedingly good in the three vegetative zones, the total yield of grasses and weeds on five correlation plots amounting to 39 per cent above the six-year average. Weed forage yields were strikingly large, and in fact, on some plots showed the largest yields since they were established in 1924. The ability of Bromus polyanthus to spread in a stand of Agropyron violaceum was demonstrated in 1929 in the Agropyron violaceum correlation plot at the station nursery. In 1927 the yield of Agropyron violaceum on the correlation plot was 84.9 of the total yield of the two species, but in 1929 it amounted to 73.5 per cent.

JORNADA RANGE RESERVE

Rainfall

Precipitation during January amounted to one-tenth of an inch. Temperatures have been low, however, and the growth of winter weeds retarded. If the high winds common throughout the first half of the month are any indication of the future, it is likely to be a hard spring.

Investigative Meeting

Campbell and Merrick attended the district Investigative Meeting January 6 to 8 at Albuquerque.

At the request of Prof. Guthrie, Campbell lectured before the ecology class at the New Mexico Agricultural College on January 18th. His subject was "Plant succession on the mesa types."

Drymaria Poisoning

In the Experiment Station Report for the month of October, the loss of cattle from poisoning by *Drymaria pachyphylla* was reported and plans were proposed for an investigation of this weed and methods of exterminating it. A test of *Drymaria* seed collected October 8th was made in the latter part of that month. It showed only 3% germination. A test now under way 14 days shows 29% germination. Some of the germinated seeds were planted in sandy clay and already several seedlings are above ground. When enough plants are secured in the laboratory, they will be cruelly and scientifically killed.

It is thought that by preliminary laboratory experiments the work in the field will be simplified and some method of control arrived at more speedily.

The cooperator plans to fence the worst of the *Drymaria* areas before the growing season.

Personnel

Gordon D. Merrick, who had been at the Great Basin Experiment Station as field assistant and assistant compiler, reported to the Jornada January 6. He will complete the compilation of the past season's field data and keep the current office work up to date in Campbell's absence.

Campbell left for a four month's detail to Washington January 27. He will work on the analysis of ten years Jornada carrying capacity data, 1915 to 1925.

-----#-----

SANTA RITA RANGE RESERVE

The Investigative Committee Meeting - held in Albuquerque from January 6 to 8 - proved to be no less interesting than similar meetings in past years with the discussions covering all phases of the research work in the region. The problem of examining and reporting on a number of areas for experimental forests, research reserves and wilderness areas was made a definite objective during the year so that more complete information on a number of possible areas might be available before the actual selections were made. The need for a more definite plan for putting into effect, on the forest ranges, the results of research in range management was voiced and fully discussed. The committee also discussed the question of climatological stations which Dr. Shantz proposes to establish in various parts of Arizona, and felt that if one is established in the vicinity of Tucson, the Santa Rita Range Reserve should be carefully considered as a possible site.

On January 10 the County Agricultural Agents terminated their yearly meeting in Tucson with a trip over the Santa Rita Range Reserve. The morning was spent at Benson Wells where the work of the reserve was briefly outlined and an opportunity given to look over a bunch of cattle that Mr. Parker corraled for the occasion. Parker's herd bulls were the subject of very favorable comment from all present and Chas. U. Pickrell spent a short time in pointing out the good points in them. Dinner was served at Florida Station where Prof. J. J. Thornber gave a brief but interesting word picture of the early history of the reserve. The afternoon was given over to discussing the results of the work and examining some of the fenced plots. In addition to the County Agents headed by Director Ross, the following were in attendance; Mrs. E. H. Crabb, Secretary Arizona Cattle Growers Association; Chas. U. Pickrell, Extension Animal Husbandman; Dr. E. D. Ball, Director of the Agricultural Experiment Station; Prof. J. J. Thornber, Botanist; Fred Winn, Donald W. Gilchrist, Biological Survey, Dr. C. T. Vorhies; Wm. G. McGinnies; John D. Jones, Assistant District Forester from Albuquerque. In all, thirty people made the trip, most of them taking advantage of the thirty passenger bus which was loaned for the occasion by the University of Arizona.

During the week of January 27 to February 1 the University of Arizona range short course was held at the Reserve headquarters. Fifteen members of the U. S. Indian Service headed by Directors Miller and Hobgood were present and the Forest Service was represented by Assistant Supervisor Anderson and Rangers Brisbin and Pomeroy. Mr.

C. R. Reynard, a large sheep owner in Argentina, attended part of the session and gave a very interesting lecture on sheep raising in that section. The opening day was given over to a discussion of wild life and its importance in range management by Doctors Vorhies and Taylor. The second and sixth days were taken up with a discussion of the investigative work and results on the reserve. On the third and fourth days Assistant Range Examiner Koogler covered the purpose and methods of range reconnaissance in detail and required each member of the school to make a number of type write-ups from which they finally worked up the carrying capacity and definite management plans for Parker's range unit on the reserve. The fifth day was occupied in finishing up range reconnaissance and in a discussion of the basic principles of range forage production by Prof. Wm. G. McGinnies.

The Indian Service men were certainly the most attentive group ever assembled at the reserve and deserve a lot of praise for their interest and concentration on the work throughout the course.

Mrs. Rose McGinnies who was appointed as Junior Clerk on January 13 to fill the vacancy created by Mrs. Hancock's resignation has recently undergone an operation and will be off duty during most of February.

As Others See Our Work

Mrs. Crabb has the following item in the Arizona Cattle Growers Association News Letter of January 14, 1930:

"It was the writer's good fortune to be included with members of the Extension Service in a trip to the Santa Rita Range Reserve, about 40 miles south and east of Tucson on last Friday. Experiments on that reserve were first started back in 1902 but it is only in recent years that much authentic data has been made available. Mr. W. R. Chapline of the Forest office in Washington is in charge of experimental work of this character from an administrative standpoint, but Mr. M. J. Culley is actively in charge of the Santa Rita Reserve, and it is he who makes all of the observations in connection with the experiments.

"A large part of the reserve is being used by cattlemen who run their cattle under specific requirements in connection with the officers in charge of the station. It is a splendid range and there is close cooperation between these cattlemen and the Forest Service officials. The entire range is a fine example of what conservative grazing will do, as cattle from this section brought highest prices last fall.

"After a delightful trip through the country leading to the Santa Rita Reserve we came to the Ranger Station where we found three inches of snow covering the ground. There were about 30 in the party,

so it's needless to say that there were about 30 good appetites, which were well satisfied after the delicious lunch which was sent out by the University, and which consisted of frijoles, ham and cheese sandwiches, pickles, coffee, doughnuts and other things dear to a hungry man - or woman. After the lunch several talks were made and then we started out to look over the experimental plots which are scattered over many miles of country. It is hard to describe on paper the work that is being done by Mr. Culley. He has different sized plots, fenced with different types of fence, the forage growth within which is under his close observation at all times. He has experimented by clipping the grass in places to see the ultimate result of over-grazing. Other plots are growing unmolested, with a chance to re-seed themselves 100% year after year. They have found that a good grass range is better when controlled year-round grazing is practiced than when it is grazed only part-time. They have found also that 23 acres of good range are sufficient for one cow. Of course, this will not hold good unless the range is good and is properly managed. We have plenty of places in Arizona where it will keep a cow busy getting a living off of 100 acres. Mr. Culley is a very conscientious, earnest worker, and he deserves a great deal of credit for his patience and care in collecting data that will be of great value to the stock raising business in future years."

-----#-----

